

CLAIMS

1. A fuel cell power generation refrigerating system characterized in that:

driving power of a compression-machine-driving motor of a vapor-compression

5 refrigerating machine (53) is provided by power generated by a fuel cell (51); and

power generated by the fuel cell (51) is supplied to a commercial system (1) side in response to that total required power of the vapor-compression refrigerating machine (53) is below a power generation capacity of the fuel cell (51) and that the refrigerating machine (53) is stopping.

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2. A fuel cell power generation refrigerating system comprising:

a vapor-compression refrigerating machine (53);

a power board (4) supplying operating power to the vapor-compression refrigerating machine (53) using a power supply of a commercial system (1) as an input;

15 a fuel cell (51);

power conversion means (52) performing predetermined power conversion using an output of the fuel cell (51) as an input to supply operating power to a compression-machine-driving motor of the vapor-compression refrigerating machine (53); and

20 power supply control means providing driving power of a compression-machine-driving motor of the vapor-compression refrigerating machine (53) by power generated by the fuel cell (51) as well as supplying power generated by the fuel cell (51) to the commercial system (1) side in response to that total required power of the vapor-compression refrigerating machine (53) is below a power generation capacity of the
25 fuel cell (51) and that the refrigerating machine (53) is stopping.

3. The fuel cell power generation refrigerating system according to claim 1 or 2, wherein

power conversion means between the commercial system and the compression-machine-driving motor and the power conversion means (52) between the fuel cell and the compression-machine-driving motor share the same inverter.

4. The fuel cell power generation refrigerating system according to claim 3, comprising a plurality of compression machines (503) for the vapor-compression refrigerating machine and a plurality of inverters (506), wherein

the number of operating compression machines (503) is controlled according to required operating load of the vapor-compression refrigerating machine, and

generated power of a fuel cell (502) is supplied to the commercial system (1) side from an inverter (506) in a not-operating compression machine system.

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5. The fuel cell power generation refrigerating system according to claim 3, adopting a bidirectional AC/DC inverter (505) as an AC/DC converter to be connected with said commercial system.

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6. The fuel cell power generation refrigerating system according to claim 3, comprising a plurality of compression machines (503) for the vapor-compression refrigerating machine, wherein

some of motors for driving some of the compression machines (503) are connected directly to the commercial system (1) side.

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7. The fuel cell power generation refrigerating system according to claim 5, wherein

a capacity of a fuel cell (502) is set higher than a capacity of an inverter (506) supplying operating power to the compression-machine-driving motor (504) of a vapor-compression refrigerating machine (503), and

generated power is supplied to the commercial system (1) side via the bidirectional AC/DC inverter (505) in response to that the fuel cell (502) is operating at the maximum capacity.

8. The fuel cell power generation refrigerating system according to any one of claims 1 to 7, wherein

the amount of power supply from the commercial system (1) side to a system inside a building including a fuel cell power generation refrigerating system (5) is detected, and

power output control of the fuel cell power generation refrigerating system (5) is performed in response to the detected amount of power supply.

9. The fuel cell power generation refrigerating system according to any one of claims 1 to 8, further comprising battery means (510) connected in parallel to the fuel cell (502).

10. The fuel cell power generation refrigerating system according to any one of claims 1 to 9, wherein

the amount of power supply from the commercial system (1) side to a system inside a building including the fuel cell power generation refrigerating system (5) is

detected,

it is detected that the detected amount of power supply has been reduced to a degree that may cause reverse power flow, and

in response to this detection, an operating capacity of the vapor-compression
5 refrigerating machine (503) is increased forcibly until the fuel cell (1) follows a load.

11. The fuel cell power generation refrigerating system according to any one of claims 1 to 10, wherein

a plurality of fuel cell power generation refrigerating systems (5) are provided
10 for one power customer.

12. The fuel cell power generation refrigerating system according to any one of claims 1 to 11, wherein

a plurality of fuel cell power generation refrigerating systems (5) are provided
15 for one power customer,

a controller (80) is provided in common for the plurality of fuel cell power generation refrigerating systems (5), and

the controller (80) provided in common at least controls operation of fuel cells (502) of the plurality of fuel cell power generation refrigerating systems (5).

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13. The fuel cell power generation refrigerating system according to any one of claims 1 to 12, wherein

the amount of power supply from the commercial system (1) side to a system inside a building including the fuel cell power generation refrigerating system (5) is
25 detected, and

the controller (80) provided in common controls operation of the fuel cells (502) in response to the detected amount of power supply.

14. The fuel cell power generation refrigerating system according to any one
5 of claims 1 to 13, further comprising:

fee output means at least outputting an electricity fee and a fuel fee; and

control means controlling operation of the fuel cell and performing distribution
control of output power in response to the fees.

10 15. The fuel cell power generation refrigerating system according to claim 14,
wherein

said fee output means allows unit cost data and fee calculation software for fee
calculation to be rewritten at a remote place.

15 16. The fuel cell power generation refrigerating system according to any one
of claims 1 to 15, wherein

said vapor-compression refrigerating machine (503) utilizes a direct expansion
cycle.